HAIL IN LOWER OHIO VALLEY

A hailstorm of wide extent occurred on Sunday afternoon, April 21, 1929, in connection with a series of depressions that at morning observation covered the Ohio and lower Mississippi Valleys with the lowest pressure at Cairo, Ill., 29.69 inches, reduced to sea level. The hail area in this vicinity covered most of Alexander and Pulaski Counties and parts of Union and Johnson Counties in Illinois, parts of Mississippi and Scott Counties of Missouri, and most of Ballard and McCracken Counties, with parts of Carlisle and Graves Counties in Kentucky. There was no hail at Cairo, the nearest being about 5 miles north and 5 miles east and southeast of station.

Hailstones over the area varied in size from one-fourth inch to 2¼ inches in diameter, over much of the area more than one-half inch. The area of heavy hail (1 inch or more in diameter) was apparently about 4 miles wide and 30 miles long, stretching from near Olive Branch and Miller City eastward across Alexander and Pulaski Counties, thence southeastward across Ballard County, Ky., diagonally to Lovelaceville. Hailstones that fell at Roth Station, 2 miles west of Cache, Alexander County, Ill., brought to Cairo, in a glass jar, were disk shaped and measured 2 inches in diameter 2 hours after falling. The time when the storm broke ranged from 2:30 p. m. at the western end of the path to 4:30 p. m. at the eastern end. At some places the fall is reported to have lasted 30 minutes.

Damage to property was confined mostly to composition roofs, automobile tops, and hotbeds; very little to windows, as the wind was not strong; approximate loss, $30,000; $20,000 in Illinois and $10,000 in Kentucky. Damages to truck crops, berries, and tree fruits can not be determined accurately, but will probably equal the amounts of property damage in the two States. No appreciable damage was reported in the Missouri area.—*W. E. B.*

HAIL IN NORTHEAST LOUISIANA

During the afternoon of April 21, 1929, the eastward movement of a trough of low pressure was attended by thundershowers in northern Louisiana and violent convectional action accompanied the shifting of the wind from southerly to westerly, a tornado occurring in one locality and a remarkable fall of hail in another.

At about 3:45 p. m., a tornado, moving eastward or slightly south of east, over a path 18 to 50 yards wide and 8 miles long, passed near Oak Ridge, in Morehouse Parish. A distinct funnel cloud, described as "very small at bottom and not spreading out until very high," was observed. The tornado demolished a few houses about 2 miles south and southwest of Oak Ridge, killing two persons and severely bruising a few others. The property damage is estimated at $7,550.

As the squall line moved farther eastward a hailstorm occurred in the vicinity of Tallulah, about 38 miles southeast of Oak Ridge, between 4:30 and 5 p. m. The hailstones, falling over an area about 20 miles wide (length not given), were scattering but remarkably large. Mr. G. L. Smith, of Tallulah, reports:

"Authentic reports have been received of a few stones measuring 4 by 4 by 6 inches. A few very large pieces of ice fell before the main storm began. The falling of large stones lasted less than 10 minutes and was followed by a little rain for about 30 minutes. Most of the stones were round and very compact. They remained on the ground for a good while after the storm had passed. The small amount of damage was no doubt due to the fact that the hailstones were not nearly so numerous as in the usual hailstorm. A little damage occurred to roofs, car tops, and glass structures. The accompanying photograph (see plate facing page 155) illustrates the size of the hailstones."—*R. A. D.*

DISCUSSION

On the morning of the 21st the pressure distribution was about as follows: An anticyclone of considerable intensity and geographic extent was centered along the west shore of Hudson Bay, the true center being a small distance inland from the mouth of Nelson River. A trough of low pressure stretched from Cape Cod to eastern Kansas and a second trough oriented northwest/southeast covered the region between southern Alberta and northern Wyoming. These two troughs were in the proper position to give showers and thunderstorms in the same 24 hours from the Atlantic to the Pacific. A single thunderstorm was occurring on the morning of the 21st in Massachusetts, thence westward there was a break in their continuity, none occurring until the Ohio Valley was reached. Here they were quite general and the area covered by them reached to eastern Kansas on the west. As the day wore on they became much more general and of greater severity in spots. In the Ohio Valley a house was blown down and the inmates suffered injury. Hail was also of general occurrence along the line of the trough from the Ohio Valley to the Atlantic.—Ed.

SQUALLS WITH RISING BAROMETER AT ROSEBURG, OREGON

551.515 : 551.54 (795) By EDGAR H. FLETCHER

[Weather Bureau Office, Roseburg, Oreg., April 15, 1929]

It frequently has been observed here in the late winter and early spring that with rising barometer and clearing weather the advancing cold air mass with the resultant steep vertical temperature gradient, causes a succession of light squalls from the west or northwest accompanied by precipitation in the form of showers (rain or snow), and usually by light hail, but without thunder and lightning. Thus there is during the greater part of the day under such conditions, a frequent alternation of sunshine and storm, with decidedly cool weather prevailing.

The small ice pellets accompanying these extremely local showers should be classified as hail, rather than sleet; for an inversion of temperature is necessary for the formation of true sleet, which usually occurs with the approach of a warm front during the colder season of the year.

These intermittent showers, occurring every hour or two during the warmer part of the day, are of short duration, usually lasting less than 30 minutes. A steep vertical temperature gradient no doubt exists at the time, and it is probable that the convectional activity is confined to a comparatively shallow layer of the air. If the maximum temperature for the day is below 50°, it is not unusual to obesrve rain, hail, snow, and probably sleet within an interval of 5 or 10 minutes, but the precipitation is always light. Often the fine ice pellets resemble sleet so closely that they are recorded as such.

It is evident that the Coast Range plays an important part in the formation of these local disturbances, since the air is forced upward to about the 2,000-foot level in

passing over the mountains. The first indication of rather strong convectional activity is seen over the Coast Range in the form of cumulus and cumulo-nimbus clouds which are associated later with a light local storm that eventually reaches the vicinity of Roseburg, 10 miles east of the main range. The whole region in this vicinity between the Coast Range and the Cascades consists of broken hills of considerable elevation and narrow, irregular valleys along the winding water courses.

During the passage of some of these storms, visibility and ceiling are reduced to a minimum, and especially if snow predominates, as it often does on the mountains and higher hills, if the day is unusually cool. It occasionally happens that an airplane is forced to land in this vicinity on account of one or more of these local "snow showers" prevailing in or near this region; but usually the chief menace from local snow storms occurs in the transverse ranges of mountains and hills marking the northern and southern limits of the Umpqua basin in which Roseburg is situated.

Weak squall conditions are likely to prevail for a day or more at a time of slowly rising barometer, or the short transition period of upward pressure tendency between the passages of successive cyclonic areas. In fact a large percentage of the rainfall during the spring season occurs under such pressure conditions, very little rain occurring while the barometer is falling, except for slight subsequent falls, or when the center of the storm passes near the station. However, there usually is a period of maximum rainfall that occurs during the first part of the pressure rise, before the squall stage is reached. The abnormally cold and dry season that has prevailed this spring, 1929, seemed to be unusually favorable for squall formation.

NOTES, ABSTRACTS, AND REVIEWS

The second conference on cycles.[1]—The first conference was held in December, 1922, and was reported on in Geographical Review, Special Supplement, vol. 13, 1923, pp. 657–676. The purpose of the second conference was the discussion of new material accumulated since the first conference.

A reading of the abstract of the work of the second conference leaves the impression that beyond methods of refinement in observational methods, the status of the problem of cycles, whether in solar radiation, tree rings, clay varves, or whatnot, has not risen above the position that it has occupied for the last quarter of a century. The suggestion was made that a point had been reached where some or all of the observations should be duplicated in the Southern Hemisphere.

The meeting was held in Washington, D. C., on December 15, 1928, under the direction of President Merriam, of the Carnegie Institution of Washington, with Dr. D. T. McDougal, of the institution's division of plant biology, in the chair; present also 35 other scientists representing a number of the physical sciences.

High lake levels.—Meteorologist J. H. Spencer, in charge of the Weather Bureau station at Buffalo, N. Y., sends the editor an account of the severe wind storm that prevailed on April 1, 1929, at that station. The speed of the wind on this occasion reached at 3:10 p. m. a velocity of 78 miles per hour, for a 5-minute period, and this is the greatest velocity of record for any month. Naturally, considerable damage was caused by the high winds; trees 1 to 2 feet in diameter were blown down, frail houses and garages were unroofed, and in some cases overturned. Several steamers in the harbor were torn loose from their moorings and the water in the harbor rose 7.8 feet above its normal level. Mr. Spencer also furnished a copy of the drawing made by the United States engineers at Buffalo from which Figure 1 is reproduced.

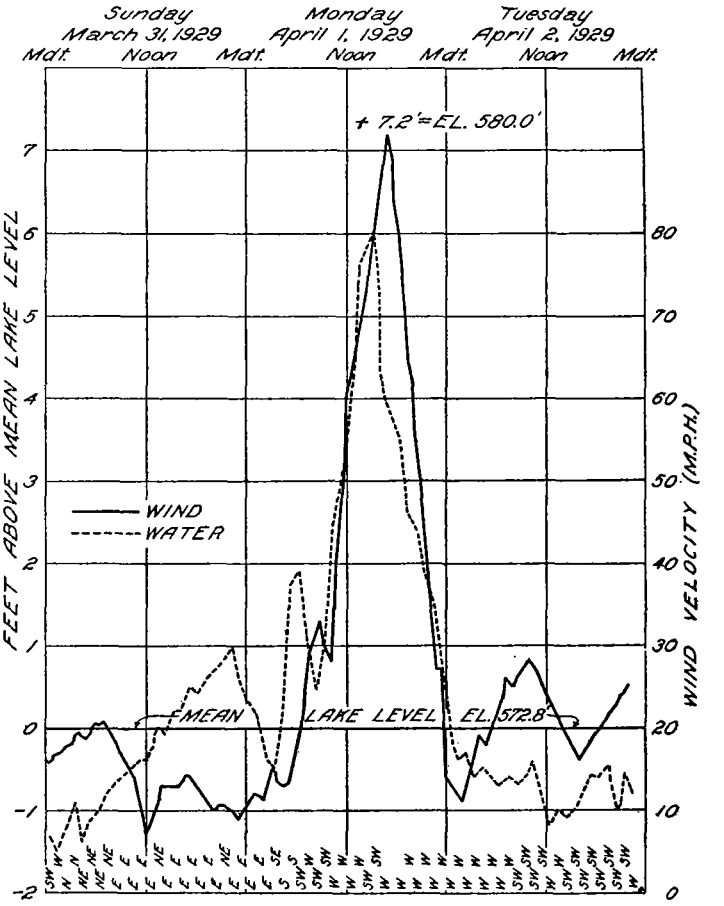

FIGURE 1.—Winds and Lake levels, April 1, 1929

The heaping up of the water of Lake Erie in Buffalo harbor due to strong westerly winds is a well-known feature of that harbor. The figure shows the rapid rise of the water almost concurrently with the increase in wind velocity; it also shows a lowering of the water in the early part of the day due to the prevalence of east winds.

On April 12, 1929, the New York Times printed dispatches from a number of places in the lake region all but one of which reported dangerously high water in the Lakes. On looking up the weather chart for the day in question it was found that east to northeast winds had prevailed for more than 24 hours. Inasmuch as the places reporting high water were on the western shore of Lake Michigan the conclusion is unavoidable that the high water was the result of wind action.—*A. J. H.*

Kalitin on illuminiation by diffused light during the solar eclipse, June 29, 1927.[2]—Malmberget, Sweden, is at latitude 67° 20′ N., longitude 20° 54′ E. Continuous records of the intensity of the illumination by diffused light were obtained by means of a potassium photocell covered with a horizontally adjusted milk-white glass with a feeble yellow light screen, selected so as to render the spectral sensitiveness of the photocell approximately

[1] Geographical Review XIX: 296-306, April, 1929.

[2] Geografiska Annaler, 1928. H. 3.